

# State of Colorado Energy & Carbon Management Commission

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Document Number:

403542430

Receive Date:

09/28/2023

Report taken by:

Kyle Waggoner

## Site Investigation and Remediation Workplan (Initial Form)

This form shall be submitted to the Director for approval prior to the initiation of site investigation and remediation activities. However, this shall not preclude the Operator from taking immediate action to protect public health or safety, the environment, wildlife, or livestock.

This Form 27 describes site conditions as currently understood by the Operator; approval of this Form 27 by COGCC is based on the site conditions accurately described herein; any changes in site conditions identified during or subsequent to the performance of the approved workplan may necessitate additional investigation or remediation which shall be described on a supplemental Form 27. This Form 27 is intended to provide basic information regarding the proposed site investigation and remediation actions, but the workplan may be more fully described in attached documentation.

Closure request is not available for an Initial Site Investigation and Remediation Workplan.

### OPERATOR INFORMATION

Name of Operator: <u>STRACHAN EXPLORATION INC</u>	Operator No: <u>83130</u>	<b>Phone Numbers</b> Phone: <u>(303) 330-1921</u> Mobile: <u>( )</u>
Address: <u>383 INVERNESS PKWY, STE 360</u>		
City: <u>ENGLEWOOD</u>	State: <u>CO</u> Zip: <u>80112</u>	
Contact Person: <u>Jason Harms</u>	Email: <u>jason@strachanexploration.com</u>	

### PROJECT, PURPOSE & SITE INFORMATION

#### PROJECT INFORMATION

Remediation Project #: 31976 Initial Form 27 Document #: 403542430

#### PURPOSE INFORMATION

- ☐ Rule 913.c.(1): Pit or Cuttings Trench closure.
- ☐ Rule 913.c.(2): Buried or partially buried vessel closure, which will be by removal.
- ☒ Rule 913.c.(3): Remediation of Spill and Releases pursuant to Rule 912.
- ☐ Rule 913.c.(4): Land treatment of Oily Waste pursuant to Rule 905.e.
- ☐ Rule 913.c.(5): Closure of Centralized E&P Waste Management Facilities pursuant to Rule 907.h.
- ☒ Rule 913.c.(6): Remediation of impacted Groundwater pursuant to Rule 915.e.(3).D, and the contaminant concentrations in Table 915-1.
- ☐ Rule 913.c.(7): Investigation and remediation of natural gas in soil or Groundwater.
- ☐ Rule 913.c.(8): When requested by the Director due to any potential risk to soil, Groundwater, or surface water.
- ☐ Rule 913.c.(9): Decommissioning of Oil and Gas Facilities.
- ☐ Rule 913.g: Changes of Operator.
- ☐ Rule 915.b: Request to leave elevated inorganics in situ.
- ☐ Other: \_\_\_\_\_

#### SITE INFORMATION

Yes Multiple Facilities

Facility Type: <u>WELL</u>	Facility ID: _____	API #: <u>099-06191</u>	County Name: <u>PROWERS</u>
Facility Name: <u>STATE 4-8</u>		Latitude: <u>38.151078</u>	Longitude: <u>-102.492836</u>
		** correct Lat/Long if needed: Latitude: _____	Longitude: _____
QtrQtr: <u>SWNE</u>	Sec: <u>8</u>	Twp: <u>22S</u>	Range: <u>45W</u> Meridian: <u>6</u> Sensitive Area? <u>Yes</u>

  

Facility Type: <u>SPILL OR RELEASE</u>	Facility ID: <u>484923</u>	API #: _____	County Name: <u>PROWERS</u>
Facility Name: <u>1300' due East of the wellsite</u>		Latitude: <u>38.150798</u>	Longitude: <u>-102.488193</u>
		** correct Lat/Long if needed: Latitude: _____	Longitude: _____
QtrQtr: <u>SWNE</u>	Sec: <u>8</u>	Twp: <u>22S</u>	Range: <u>45w</u> Meridian: <u>6</u> Sensitive Area? <u>Yes</u>

## SITE CONDITIONS

General soil type - USCS Classifications SP

Most Sensitive Adjacent Land Use Grassland

Is domestic water well within 1/4 mile? No

Is surface water within 1/4 mile? Yes

Is groundwater less than 20 feet below ground surface? Yes

### **Other Potential Receptors within 1/4 mile**

Closest Domestic Well – 1.87 miles southeast  
Additional Domestic Wells – none  
Nearest Surface Water – Big Sandy Creek ~100' E  
Nearest Occupied Building – 1.43 miles southwest  
Additional Occupied Buildings – 2.0 miles northeast  
Within 100-Year Effective Floodplain Buffer  
Inside Aquatic Native Species Conservation Waters Buffer  
Mule Deer Severe Winter Range Buffer mapped 0.27 miles south  
Inside Lesser Prairie Chicken Connectivity Area Buffer  
Inside Lesser Prairie Chicken Estimated Occupied Range Buffer  
No other potential receptors are located within 1/4 mile of the Site  
Above distances are approximations

## **SITE INVESTIGATION PLAN**

### **TYPE OF WASTE:**

☒ **E&P Waste** ☐ **Other E&P Waste** ☐ **Non-E&P Waste**

☒ Produced Water

☐ Workover Fluids

☐ Oil

☐ Tank Bottoms

☒ Condensate

☐ Pigging Waste

☐ Drilling Fluids

☐ Rig Wash

☐ Drill Cuttings

☐ Spent Filters

☐ Pit Bottoms

☐ Other (as described by EPA)

### **DESCRIPTION OF IMPACT**

Impacted?	Impacted Media	Extent of Impact	How Determined
Yes	GROUNDWATER	Unknown	Grab Groundwater Sample
Yes	SOILS	Unknown	Soil Sampling

### **INITIAL ACTION SUMMARY**

Description of initial action or emergency response measures taken to abate, investigate, and/or remediate impacts associated with E&P Waste.

On 8/3/23, a leak was discovered along the flowline of the State 4-8 well, approximately 1,200' east of the facility and 100' east of Big Sandy Creek. The State 4-8 well was shut-in at the time of discovery. On 8/3/23, the line was daylighted and repaired with a standard pipeline clamp, which was centered on the less than 1/4" hole. The hole was non-corrosive and located in the 6 o'clock position on the line. To prevent future releases, this section of flowline will be converted to polyline.

Waste characterization soil sample WC01@4 was collected adjacent to the flowline leak and was submitted for analysis of full Table 915-1 analytes. Additional soil samples (EX01@5, SS1@4 and SS2@5) were collected for vertical and lateral delineation of organic compounds and were submitted for BTEXN, TMBs and TPH. Two background samples (BG1@4, BG2@5) were collected and submitted for analysis of pH, EC, SAR, boron, arsenic, barium and selenium. One grab groundwater sample (GW01) was collected from groundwater encountered at 6 ft-bgs, below the flowline leak, and was submitted for analysis of BTEXN and TMBs.

Benzene, toluene, pH, arsenic, barium and selenium were reported above their respective Table 915-1 protection of groundwater soil screening level concentrations (GWSSLs) in waste characterization sample WC01@4. BTEX and TMB exceedances were reported in vertical delineation soil sample EX01@5 and lateral delineation soil sample SS2. Table 915-1 organics (excluding PAHs) were not detected in lateral delineation soil sample SS1.

Benzene was reported above Table 915-1 standard in grab groundwater sample GW01. All other Table 915-1 organics in groundwater were reported as compliant with their respective standards. Analytical results are provided in Table 2, Table 3, Table 4 and Table 5, and are displayed on Figure 2. Analytical reports and a photographic log of sampling activities are also attached.

### **PROPOSED SAMPLING PLAN**

#### **Proposed Soil Sampling**

☒ Will soil samples be collected as part of this investigation? ( Number, type (grab/composite), analyses, and locations of samples ):

Excavation is tentatively planned for impacted soils at the site. During the proposed excavation activities, soil samples will be collected every 20 lateral feet from the sidewalls of the excavation and submitted for analysis of analytes proposed in the Operator Comments section below. Soil samples will be collected and analyzed until the horizontal extents of excavation above groundwater are within respective Table 915-1 GWSSLs. Groundwater is expected to be encountered between 5 and 6 ft-bgs during proposed excavation activities. In lieu of collecting saturated soil samples from the floor of the excavation, the excavation will be backfilled, groundwater monitoring wells will be installed, and groundwater monitoring will continue on a quarterly basis.

## Proposed Groundwater Sampling

☒ Will groundwater samples be collected as part of this investigation? ( Number, analyses, and locations of samples ):

Following the installation of groundwater monitoring wells at the site, groundwater samples will be submitted for laboratory analysis of Table 915-1 organic compounds in groundwater and groundwater inorganic parameters. Following the initial groundwater monitoring event, inorganics will be compared to the upgradient point of compliance well and if inorganics are determined to be representative of background levels, a reduced analyte request will be submitted for organic compounds in groundwater only.

## Proposed Surface Water Sampling

☐ Will surface water samples be collected as part of this investigation? ( Number, analyses, and locations of samples ):

## Additional Investigative Actions

☐ Additional alternative investigative actions described in attached Site Investigation Plan ( summary ):

During each monitoring well installation, soils will be logged and field-screened using a photo-ionization detector (PID), and at least one grab soil sample will be collected from each boring for analysis of analytes listed in the reduced analytes request of the Operator Comments section below. Soil sample intervals for laboratory analysis will be determined based on the highest PID reading within the vadose zone from each boring, or if no impacts are suspected, from the interval determined to be just above the groundwater interface.

# SITE INVESTIGATION REPORT

## SAMPLE SUMMARY

### Soil

Number of soil samples collected 4

Number of soil samples exceeding 915-1 3

Was the areal and vertical extent of soil contamination delineated? No

Approximate areal extent (square feet) 1200

### NA / ND

-- Highest concentration of TPH (mg/kg) 64

-- Highest concentration of SAR 5.11

BTEX > 915-1 Yes

Vertical Extent > 915-1 (in feet) 5

### Groundwater

Number of groundwater samples collected 1

Was extent of groundwater contaminated delineated? No

Depth to groundwater (below ground surface, in feet) 6

Number of groundwater monitoring wells installed 0

Number of groundwater samples exceeding 915-1 1

-- Highest concentration of Benzene (µg/l) 1200

-- Highest concentration of Toluene (µg/l) 110

-- Highest concentration of Ethylbenzene (µg/l) 120

-- Highest concentration of Xylene (µg/l) 200

NA Highest concentration of Methane (mg/l)

### Surface Water

0 Number of surface water samples collected

Number of surface water samples exceeding 915-1

If surface water is impacted, other agency notification may be required.

## OTHER INVESTIGATION INFORMATION

☐ Were impacts to adjacent property or offsite impacts identified?

☒ Were background samples collected as part of this site investigation?

Two background samples (BG1@4, BG2@5) were collected from two sample locations undisturbed by oil and gas activities near the State 4-8 flowline release and were submitted for analysis of pH, EC, SAR, boron, arsenic, barium and selenium. Background analytical results demonstrate that EC, SAR, arsenic and barium concentrations exist naturally at this location above Table 915-1 GWSSLs. EC results were averaged for both background samples to establish a baseline background concentration of 7.71 mmhos/cm. SAR results were similarly averaged to establish background concentration of 13.35. Arsenic results were averaged for both background samples and multiplied by 1.25 to establish a baseline background concentration of 1.11 mg/kg.

☐

Was investigation derived waste (IDW) generated as part of this investigation?

Volume of solid waste (cubic yards) \_\_\_\_\_

Volume of liquid waste (barrels) \_\_\_\_\_

☒ Is further site investigation required?

Yes, additional soil samples will be collected during monitoring well installation as discussed in the Additional Investigative Actions section above.

## REMEDIAL ACTION PLAN

### SOURCE REMOVAL SUMMARY

Describe how source is to be removed.

Excavation activities will commence in the area of the former flowline release and waste characterization soil sample WC01@4. As necessary, impacted soils will be removed down to the groundwater interface and transported for disposal at Otero Landfill. Transport and disposal records will be kept on file and will be available upon request. Soil samples will be collected and analyzed for the analytes proposed in Operator Comments until the horizontal extents of excavation above groundwater is within respective Table 915-1 GWSSLs.. If necessary, impacted saturated soil from below groundwater will be excavated and removed for disposal as much as safely practical. Once compliance is determined laterally in confirmation sidewall soil samples, the excavation will be backfilled with clean material. A proposed excavation outline is displayed on Figure 3. Remaining saturated zone soil and groundwater impacts will be monitored for natural attenuation until groundwater analytical results are within Table 915-1 concentrations for four consecutive quarters as discussed in the Groundwater Monitoring section below. Additional groundwater remediation strategies will be evaluated if needed.

### REMEDATION SUMMARY

Describe how remediation of existing impacts to soil and groundwater is to be accomplished (i.e. summarize remedial action plan). Provide a brief narrative description including: technical justification, schedule for implementation, estimated time to attain NFA status, plus plans and specifications for the selected remedial action technology.

Strachan Exploration proposes to conduct supplemental excavation to remove impacted soils above groundwater until the lateral extents are within Table 915-1 concentrations and monitor saturated zone soil and groundwater for natural attenuation via the installation of groundwater monitoring wells. Proposed excavation activities are discussed in Proposed Soil Sampling section above. Proposed soil boring sampling during monitoring well installation is discussed in Additional Investigation Activities section above. Groundwater well installation and monitoring is discussed in the Groundwater Monitoring section below. A proposed reduced analyte suit for soil sampling is discussed in the Operator Comment section below.

During excavation activities, a groundwater amendment (COGAC or BOS200, for example) may be added to the groundwater interface in the bottom of the excavation to begin biological remediation processes of any residual hydrocarbons remaining below groundwater at the site.

### Soil Remediation Summary

☐ In Situ

\_\_\_\_\_ Bioremediation ( or enhanced bioremediation )

\_\_\_\_\_ Chemical oxidation

\_\_\_\_\_ Air sparge / Soil vapor extraction

\_\_\_\_\_ Natural Attenuation

\_\_\_\_\_ Other \_\_\_\_\_

☐ Ex Situ

\_\_\_\_\_ Excavate and offsite disposal

\_\_\_\_\_ If Yes: Estimated Volume (Cubic Yards) \_\_\_\_\_

\_\_\_\_\_ Name of Licensed Disposal Facility or COGCC Facility ID # \_\_\_\_\_

\_\_\_\_\_ Excavate and onsite remediation

\_\_\_\_\_ Land Treatment

\_\_\_\_\_ Bioremediation (or enhanced bioremediation)

\_\_\_\_\_ Chemical oxidation

\_\_\_\_\_ Other \_\_\_\_\_

### Groundwater Remediation Summary

\_\_\_\_\_ Bioremediation ( or enhanced bioremediation )

\_\_\_\_\_ Chemical oxidation

\_\_\_\_\_ Air sparge / Soil vapor extraction

\_\_\_\_\_ Natural Attenuation

\_\_\_\_\_ Other \_\_\_\_\_

### GROUNDWATER MONITORING

If groundwater has been impacted, describe proposed monitoring plan, including # of wells or sample points, monitoring schedule, analytical methods, points of compliance. Attach a groundwater monitoring location diagram.

Following backfill activities, a minimum of 5 groundwater monitoring wells will be installed at the site: one well in the source area of the release, and four wells outside of the footprint of remedial excavation to define to upgradient, downgradient and cross-gradient extents of groundwater impacts. Proposed groundwater monitoring well locations are displayed on Figure 3. Additional wells may be needed to delineate the extents of groundwater impacts. During each monitoring well installation, soils will be logged and at least one sample collected as discussed in the Additional Investigative Actions section above. Groundwater will be monitored for natural attenuation until groundwater analytical results are within Table 915-1 concentrations for four consecutive quarters.

## REMEDIATION PROGRESS UPDATE

### PERIODIC REPORTING

#### Approved Reporting Schedule:

☐ Quarterly☐ Semi-Annually☐ Annually☒ Other

A Sup Form 27 will be submitted within 90 days of receipt of groundwater analytical results

#### ☐ Request Alternative Reporting Schedule:

☐ Semi-Annually☐ Annually☐ Other

#### Rule 913.e:

After initial approval of a Form 27, the Operator will provide quarterly update reports in a Supplemental Form 27 to document progress of site investigation and remediation, unless an alternative reporting schedule has been requested by the Operator and approved by the Director. The Director may request a more frequent reporting schedule based on site-specific conditions.

**Report Type:** ☐ Groundwater Monitoring ☐ Land Treatment Progress Report ☐ O&M Report

☐ Other \_\_\_\_\_

### Adequacy of Operator's General Liability Insurance and Financial Assurance

Describe the adequacy of the Operator's general liability insurance and Financial Assurance to fully address the anticipated costs of Remediation, including the estimated remaining cost for this project (below).

If this information has been provided on a Form 27 within the last 12 months, provide the Document Number of that form.

Operator does not have site-specific financial assurance for this project; however, Operator has surface, plugging, and gas facility bonding including Surety IDs 20170089, 20170088, 20160134, 20160133 and 20150065, as well as commercial general liability and/or umbrella/excess insurance meeting the requirements of Rule 705.b. Operator anticipates it will make an insurance claim for this project.

- Initial sampling activities have been conducted.
- Excavation and drilling activities have not been conducted.

Costs included herein are estimates only and may change over time based on numerous factors. Accordingly, Operator makes no guarantees as to the accuracy of such cost estimates, thus providing an estimate for the next year below.

Operator anticipates the remaining cost for this project to be: \$ 100000

### WASTE DISPOSAL INFORMATION

Was E&P waste generated as part of this remediation? No

Describe beneficial use, if any, of E&P Waste derived from this remediation project:

Volume of E&P Waste (solid) in cubic yards \_\_\_\_\_

E&P waste (solid) description \_\_\_\_\_

COGCC Disposal Facility ID #, if applicable: \_\_\_\_\_

Non-COGCC Disposal Facility: \_\_\_\_\_

Volume of E&P Waste (liquid) in barrels \_\_\_\_\_

E&P waste (liquid) description \_\_\_\_\_

COGCC Disposal Facility ID #, if applicable: \_\_\_\_\_

Non-COGCC Disposal Facility: \_\_\_\_\_

# RECLAMATION PLAN

## RECLAMATION PLANNING

Describe reclamation plan. Discuss existing and new grade recontouring; method and testing of compaction alleviation; and reseeding program, including location of new seed, seed mix and noxious weed prevention. Attach diagram or drawing.

Following excavation activities, the location will be backfilled, compacted, and re-contoured to match pre-existing conditions. The location will be reclaimed in accordance with the COGCC 1000 series.

Is the described reclamation complete? No \_\_\_\_\_

Does the reclamation described herein constitute interim or final reclamation of the Oil and Gas Location?

☐ Interim ☐ Final

Did the Surface Owner provide the seed mix? \_\_\_\_\_

If YES, does the seed mix comply with local soil conservation district recommendations? \_\_\_\_\_

Did the local soil conservation district provide the seed mix? \_\_\_\_\_

## SITE RECLAMATION DATES

Proposed date of commencement of Reclamation. \_\_\_\_\_

Proposed date of completion of Reclamation. \_\_\_\_\_

## IMPLEMENTATION SCHEDULE

Per Rule 913.d.(2): Any change from the approved implementation schedule will be requested at least 14 days in advance, and the Operator may not make the change without the Director's approval.

## PRIOR DATES

Date of Surface Owner notification/consultation, if required. 08/03/2023

Actual Spill or Release date, or date of discovery. 08/03/2023

## SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 08/16/2023

Proposed site investigation commencement. 11/13/2023

Proposed completion of site investigation. \_\_\_\_\_

## REMEDIAL ACTION DATES

Proposed start date of Remediation. 11/13/2023

Proposed date of completion of Remediation. \_\_\_\_\_

Per Rule 913.d.(2): Any change from the approved implementation schedule will be requested at least 14 days in advance, and the Operator may not make the change without the Director's approval.

☐ Change from approved implementation schedule per Rule 913.d.(2).

Basis for change in implementation schedule:

## OPERATOR COMMENT

Based on analytical results for waste characterization soil sample WC01@4 and background soil samples BG1@4 and BG2@5, Strachan proposes a reduced analytical suite for future soil sampling to include benzene, toluene, ethylbenzene, total xylenes, 1,2,4 TMB, 1,3,5 TMB, and pH. Barium reported for WC01@4 is higher than 1.25x the average of background barium concentrations; however, the concentration reported for BG2@5 (23.8 mg/kg) is interpreted to be an outlier. Barium reported for WC01@4 (92.1 mg/kg) is less than 1.25x the barium concentration reported for BG1@4 (106.13 mg/kg). Arsenic and selenium concentrations reported for waste characterization sample WC01@4 are below 1.25x the background concentrations reported for background soils samples BG1 and BG2.

Material removed during repair of the flowline and initial soil sampling was used to backfill the excavation and will be removed during the proposed excavation activities. A supplemental Form 27 will be submitted within 90 days following receipt of the final analytical results, and additional supplemental Form 27's will be submitted quarterly thereafter.

Landowner, CPW, local government, and CDPHE notifications/consultations have been completed and that information will be provided in the Supplemental Form 19 closure with work proceeding under the project's remediation number once issued.

I hereby certify all statements made in this form are to the best of my knowledge true, correct, and complete.

Signed: Ben Baugh

Title: Senior Geologist

Submit Date: 09/28/2023

Email: bbaugh@entradainc.com

Based on the information provided herein, this Application for Site Investigation and Remediation Workplan complies with COGCC Rules and applicable orders and is hereby approved.

COGCC Approved: Kyle Waggoner

Date: 10/09/2023

Remediation Project Number: 31976

## COA Type

## Description

	ECMC does not approve reduced analyte sampling, Operator shall analyze samples for full 915-1 at this time
	Operator will Follow Rule 905. for Management of E&P Waste
	Per Rule 912.a.(2) Operators will investigate, clean up, and document impacts resulting from Spills and Releases as soon as the impacts are discovered.
	Operator shall collect confirmation soil samples as described in the Rule 915.e.(2) Guidance Document. Operator will analyze soil samples for TPH (C6-C36), Table 915-1 Organic Compounds in Soil, Table 915-1 metals, and Table 915-1 Soil Suitability for Reclamation (Electrical conductivity, Sodium adsorption ratio, and pH by saturated paste method, boron (hot water soluble)).
	Operator shall submit Quarterly Updates for this remediation project every 90 days as required by Rule 913.e. Quarterly updates shall include a current map of the subject location including current excavation limits and/or sample locations, proposed/actual soil boring locations and monitoring well locations. GPS data used to create the map must comply with ECMC Rule 216. Operator will include historical and recent soil analytical data in a table format in Quarterly updates. Operator shall submit field notes of all field activities reported during a Quarterly Update.
	The surface area disturbed by the remediation activity shall be reclaimed in accordance with the 1000 Series Reclamation Rules. For locations with active ongoing oil and gas operations, comply with Rule 1003 interim reclamation requirements and for locations that will no longer have active oil and gas operations, comply with Rule 1004 Final Reclamation requirements.

6 COAs

## Attachment Check List

Upon approval, the approved Form 27 and all listed attachments will be indexed to the Remediation Project file. Only the approved Form 27 will also be indexed to the related Facilities.

### Att Doc Num

### Name

403542430	FORM 27-INITIAL-SUBMITTED
403542487	ANALYTICAL RESULTS
403542488	ANALYTICAL RESULTS

403542489	PHOTO DOCUMENTATION
403542490	MAP
403545039	SOIL SAMPLE LOCATION MAP
403545040	MAP

Total Attach: 7 Files

### **General Comments**

<b><u>User Group</u></b>	<b><u>Comment</u></b>	<b><u>Comment Date</u></b>
Environmental	Background soil samples potentially within the footprint of the release	10/04/2023

Total: 1 comment(s)